WHAT IS CLAIMED IS:

1. A brush motor for an electric power steering system comprising:

a four-pole field portion fixed to an inner wall surface of a yoke;

an armature including;

windings wound around a core with 22 slots to constitute a lap winding,

hooks which are formed on one ends of 22 commutator segments respectively and on which the windings are hooked, and

a cylindrical commutator which is constructed by molding integrally the commutator segments with a resin so that convex portions for preventing fling-out of the commutator segment are provided on an inner peripheral surface side of each commutator segment to extend over an almost full length in an axial direction; and

four brushes which contact slidably to outer peripheral surfaces of the commutator segments; wherein

when the commutator to which a sliding contact portion of the brush contacts is sectioned perpendicularly to an axial direction,

a relationship of $0.18 \leq (A \times N) / (D \times D) \leq 0.23$ is satisfied,

where A is a sectional area (mm^2) of one commutator segment, N is a number of the commutator segments, and D is a diameter

(mm) of outer peripheral surfaces of the commutator segments.

2. A brush motor for an electric power steering system comprising:

a four-pole field portion fixed to an inner wall surface of a yoke;

an armature including;

windings wound around a core with 22 slots to constitute a lap winding,

hooks which are formed on one ends of 22 commutator segments respectively and on which the windings are hooked, and

a cylindrical commutator which is constructed by molding integrally the commutator segments with a resin, so that one leg portion is provided on an inner peripheral surface side of each commutator segment to extend over an almost full length in an axial direction and convex portions for preventing fling-out of the commutator segment are provided to one end of the leg portion; and

four brushes which contact slidably to outer peripheral surfaces of the commutator segments; wherein

when the commutator to which a sliding contact portion of the brush contacts is sectioned perpendicularly to an axial direction,

a relationship of $0.10 \leq T/D \leq 0.14$ is satisfied,

where T is a thickness (mm) of the commutator segment in a radial direction, and D is a diameter (mm) of outer peripheral surfaces of the commutator segments.

3. The brush motor for an electric power steering system according to claim 1, wherein

at least two windings of the armature are hooked on each of the hooks.

4. The brush motor for an electric power steering system according to claim 1, wherein

an equalizer is hooked on each of the hooks.

5. The brush motor for an electric power steering system, according to claim 1, further comprising:

a brush holder for holding the brush and having a parts, which is made of resin, in neighborhood of at least the brush.

6. The brush motor for an electric power steering system, according to claim 1, wherein

a part of the brush in the axial direction contacts slidably to the commutator segments.

7. The brush motor for an electric power steering system, according to claim 1, wherein

the brush has a shape that contacts slidably to more than three commutator segments that are formed adjacently in a circumferential direction.

8. The brush motor for an electric power steering system, according to claim 1, wherein

a diameter of the outer peripheral surfaces of the commutator segments is 20 mm to 50 mm.

9. The brush motor for an electric power steering system according to claim 2, wherein

at least two windings of the armature are hooked on each of the hooks.

10. The brush motor for an electric power steering system according to claim 2, wherein

an equalizer is hooked on each of the hooks.

11. The brush motor for an electric power steering system, according to claim 2, further comprising:

a brush holder for holding the brush and having a parts, which is made of resin, in neighborhood of at least the brush.

12. The brush motor for an electric power steering system, according to claim 2, wherein

a part of the brush in the axial direction contacts slidably to the commutator segments.

13. The brush motor for an electric power steering system, according to claim 2, wherein

the brush has a shape that contacts slidably to more than three commutator segments that are formed adjacently in a circumferential direction.

14. The brush motor for an electric power steering system, according to claim 2, wherein

a diameter of the outer peripheral surfaces of the commutator segments is 20 mm to 50 mm.